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# A TALK ON ARC LAMPS



FRANKLIN INSTITUTE  
The C. J. TOERRING COMPANY  
Philadelphia, Penna.

## **...Guarantee...**

We guarantee our lamps against all mechanical and electrical defects for the term of one year, but will not hold ourselves responsible for carelessness, lack of attention, lightning or other causes beyond our control. Should a lamp prove defective we will cheerfully repair it at our works free of charge. To obtain the best results the lamps should be installed and operated as described in our printed instructions.

APR 1941

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# ENCLOSED ARC LAMPS

For Constant Potential 110 and 220 Volt Circuits



IN 1899 we placed on the market the first TOERRING Enclosed Arc Lamp with a guaranteed life of 200 hours. The demand for this lamp, with its many new features, has steadily increased. With the growth of our business we have perfected an equipment of the most modern machinery and methods, and our engineers, devoting their entire time to problems in commercial lighting, have developed a really good arc lamp at a reasonable price.

The original lamps turned out by us were somewhat in advance of any other lamps in the field—there are thousands of them now in service, giving the same high degree of satisfaction as the day they were bought—and they have maintained that position by



Figure 1

keeping pace with the general advance in the art of illumination. The changes and improvements made, wherever, as our experience indicated, such changes were necessary, have resulted in a lamp quite different in many ways from the original. Complicated connections have been eliminated, the form of resistance has been perfected, and the general construction has been simplified. The TOERRING lamp of to-day, therefore, has all the good features of the older types and has added to these an arrangement of mechanism which assures easy access to all parts.

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In this bulletin we describe, as completely as may be, the several features of our product. Some pictures of standard lamps are presented, together with views of the mechanism which illustrate the text and show the relative position of the various parts.

## CASING

Figure 1 gives a general view of the lamp complete, with standard casing and globe. In general we have preferred to adhere to simplicity of design, believing that a casing of this kind will more nearly harmonize with its surroundings, no matter where it may be placed. We have an excellently finished casing, ornamental, but free from unnecessary grooves and curves, which serve only to catch dust and require constant cleaning.

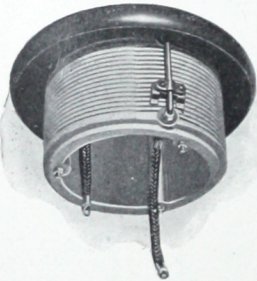
To remove the casing it is only necessary to loosen two nuts, give it a slight twist and it drops down, exposing the entire mechanism of the lamp, as shown in Figures 2 and 3. Then any repairs can be made without removing the lamp from its hook, a point of supreme importance whether the installation be large or small.

## FRAMEWORK

What may be termed the framework of the TOERRING lamp is illustrated in Figure 4. This structure is common to all types of our lamps, and it is on this that the different forms of mechanism are mounted, making the lamps interchangeable.

## RESISTANCE

At the top of the lamp, directly under the hood, and secured to it by three bolts, is mounted the resistance. This being the most vital part of an arc lamp, we have given great care to its design and construction, and have adopted our present form of resistance after a long series of tests which have demonstrated that it is the only form that will give uniformly satisfactory results



**Resistance**

under all conditions. The wire is wound in one piece, in grooves, on a large porcelain drum, in a manner that prevents a turn from sagging or shortcircuiting on the turn below, even if the lamp be shortcircuited. The porcelain, in addition to providing support for the wire, also is of such size and construction that it provides ample radiating surface for the heat generated when the lamp is in service. There is no danger of breakage. Our object has not been to get the resistance in the smallest possible space and then let it take care of itself, but rather to give to this most important part all the space that it needs and provide for it proper means of ventilation. The casing is so constructed that a constant supply of cool air passes over the resistance without first passing through the mechanism of the lamp. This

is the only efficient method of keeping the temperature at a low point.

## ADJUSTMENT

The adjustment clip is strongly made, provides a positive contact, and can be readily moved either up or down, even when the lamp is heated, if at any time it should be necessary to change the arc voltage after the lamp has been burning for some time.

## MAGNET SPOOLS

From the resistance the current passes to the magnet spools, which are large and well made, both mechanically and electrically. These are mounted on the superstructure, removed both from the resistance and the arc, where they are not affected by the heat from either source. The spools, like the resistance, are designed to take without injury a current of three times the normal—all helping to establish the large factor of safety in the TOERRING lamp.



**Magnet Spools**



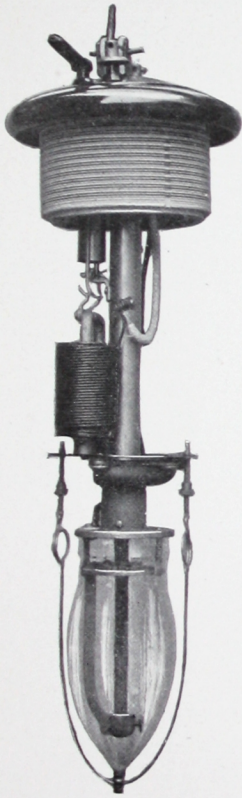


Figure 2

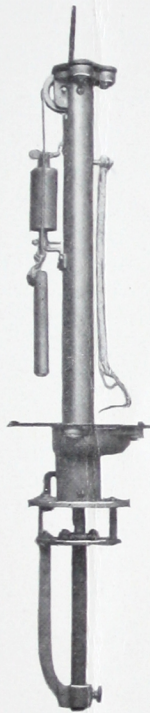


Figure 4

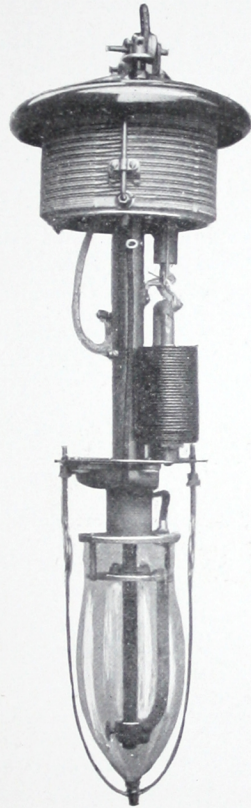


Figure 3



The dash pot is immediately above the spools. It has a graphite piston and a valve regulated to take up the jar incident to feeding without interfering with the quick and perfect regulation of the arc.

## CONTACTS

From the magnet spools to the upper carbon holder the current is carried by a flexible asbestos insulated cable secured to the binding posts in a way that removes all mechanical strain from the electrical connections. **This cable is not inside the supporting tubes of the lamp—where it is often placed in other lamps—it is in full view when the casing is removed, and can be replaced in a few minutes should such a change become necessary.**

This removes one of the most frequent sources of trouble in arc lamp construction, and is an improvement that will be appreciated, particularly by any one who has had the usual costly experience with inner cables and sliding contacts.

## CARBON HOLDERS

The upper, or positive, carbon holder cannot be affected by the heat of the lamp and will always provide a good grip.

The negative carbon is held in position by a small casting attached to the lower frame. If this casting should become burnt—due to careless trimming—it can easily be replaced without renewing the entire lower frame of the lamp.

The current is carried directly from the lower frame to the negative binding post—all current-carrying parts being properly insulated.

## CLUTCH

An insulated clutch is another new departure—this operates the carbon in feeding the lamp—and as it never carries any current it cannot become burnt, thus permitting the carbon to drop down and short-circuit the lamp.

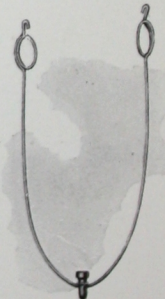
Each lamp is provided with a hood switch, positive in action, with ample break, and is easily operated by hand.



Cylinder

## CYLINDER BREAKAGE

has been reduced to a point thought impossible a short time ago, by so designing the inner globe, its holder and cap, that the full heat of the arc does not strike the ground edge, but is deflected by a plate inside the cylinder, just above the arc. There are many cases where TOERRING inners have lasted over two years—and if breakage, due to careless trimming, is kept low, the average life of a cylinder will be about twelve months. As the picture shows, the cylinder can readily be cleaned by hand, and is held in place by a bale made of heavy phosphor bronze spring wire large enough to give proper support but so arranged that it casts no perceptible shadow. In fact, all parts of the lamp below the arc, or in line with it, are so small that the shadow is reduced to a minimum—a decided contrast to many lamps with their massive light obstructing lower frames.



Bale



## TRIMMING

Any make of lamp can be readily trimmed when cold—most of them are very difficult to trim when hot. We have overcome this difficulty by designing the lamp so that the cylinder may be removed without disturbing either carbon. When the cylinder is removed both carbons are perfectly accessible, and it is only necessary to replace the upper carbon, use the stub of the old upper for the new lower, and the lamp is ready for another 200-250 hours.

It is as easy to trim as an open arc lamp, with the added advantage that you do not have to centre the carbons nor cut the negative one to size.



Plain Casing

## CARBON LIFE

We guarantee a life of from 200 to 300 hours, using the same size carbons which in other lamps produce from 100 to 150 hours. Since we placed the first long-life lamp on the market we have had to answer many arguments advanced in favor of the cheaper short-life lamps. Probably the most curious has been that after 100 hours burning the ash deposited on the cylinder was already so dense as to obscure the light and make cleaning a necessity, consequently a lamp could not give satisfactory service for a longer time with one trimming. This would be correct, no doubt, if we used twice the carbon to get twice the life; but as we require only one-half as much carbon for any given time, the ash deposited on the cylinder is only one-half as great, and we therefore can have no more ash on the cylinder after 200 hours of burning than others have after 100 hours.

## ECONOMY

Long carbon life, such as this, means a saving on each lamp of from \$2.00 to \$5.00 a year, depending on the constancy with which the lamp is burned. This includes a saving of approximately 50 per cent. in carbons and labor, to say nothing of the saving in cylinders, the greater number of which are broken, not by the heat of the arc, but by hasty trimming.





**A Weighty  
Argument**

The mechanism of the lamp is simple—not with the simplicity that is due to skimping and false economy, but rather that which is the result of experience and thought. The parts are so shaped and mounted that they will not only fulfill their own particular purpose, but will also properly harmonize with and assist other parts with which they may be co-related. Repairs and adjustments can therefore be quickly made without making it necessary to call in an arc lamp expert. With most lamps it is the work of hours to locate and remove trouble.

## THE FACTOR OF SAFETY

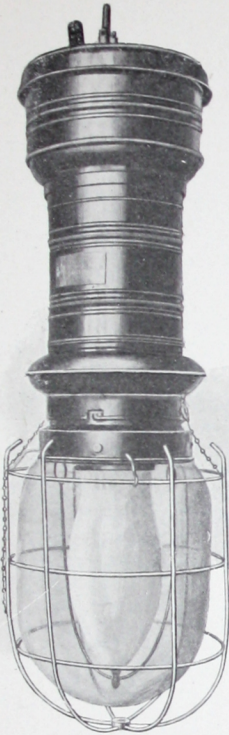
in all parts is so large that the TOERRING lamp is practically indestructible in case of an accidental short-circuit. It goes without saying that a lamp can be made and sold at a lower price if all the parts are small and designed to give satisfactory service only under normal conditions. Probably any lamp will do that. But it is not enough that a lamp will burn, and burn well, under such conditions—how will it burn in case of an accidental short-circuit? With very lightly wound spools, and a poorly designed resistance, it will burn up in a short time, thus requiring the purchase of a new lamp.

**We have had a lamp on short-circuit test for 77 hours, when our competitors' burned up in from 6 to 35 minutes. At the expiration of 77 hours the test was discontinued, and the TOERRING lamp was voted indestructible.**

We do not therefore attempt to compete in price with lamps in which cheapness is the sole object in view. Such competition would only mean a lowering of our present standard—but where mechanical and electrical excellence, durability and efficiency are considered, the TOERRING LONG-LIFE LAMP is the most economical—it will save you money, no matter what may be the first cost of others.



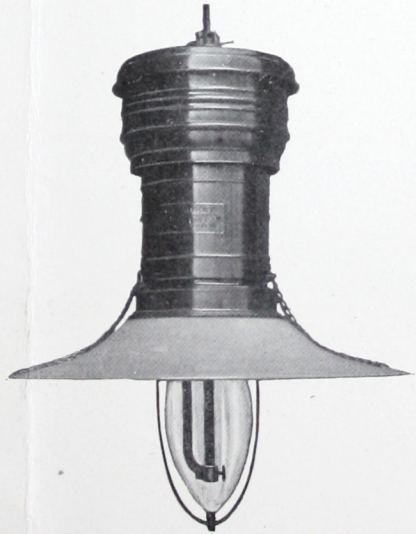




**Marine Type**

In the Marine Type Lamp all exposed parts are heavily tinned to protect them from corrosion. The outer globe is made narrow and is protected by a heavy wire guard. This lamp is used on docks, ships, barges, etc., and may conveniently be moved from place to place as needed.

The 18-inch Lamp was designed to meet the demand for lamps to be used on low ceilings. It has a life of 150 hours and is thoroughly reliable.



**Short Type—18 in. Long**

## INVERTED ARC LIGHTING

The chief merit of this system of Arc Lighting may be attributed to the perfect light diffusion which it provides. For this reason the lamp is particularly suited to the lighting of Draughting Rooms, Silk Mills and other Textile Mills, and wherever no glare and a minimum of shadow is wanted.

We manufacture three distinct types for this service.

First—An Inverted Arc Lamp (Figure 5) having the positive carbon inverted from the usual position, thereby throwing the light directly against the ceiling or ceiling reflector without the loss by reflection. Prices on this lamp will be furnished on application.

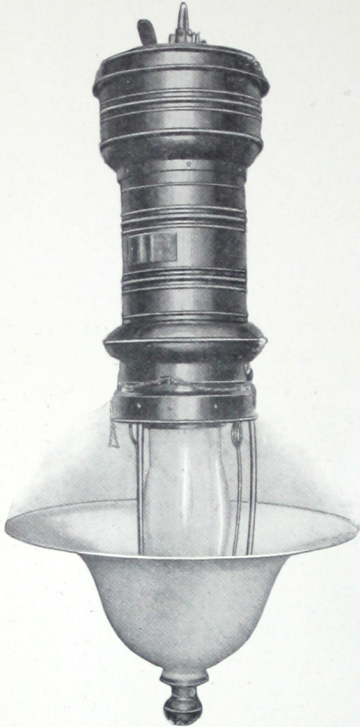


Figure 6

Second—A standard lamp is provided with a bottom reflector made of opal glass (Figure 6). In this case a large proportion of the light passes through the opal glass reflector, while some of the light is reflected to the ceiling or ceiling reflector and from there back into the room.

This method does not provide so perfect a diffusion as will be obtained with either the first or third equipment, but has the advantage of lower first cost.

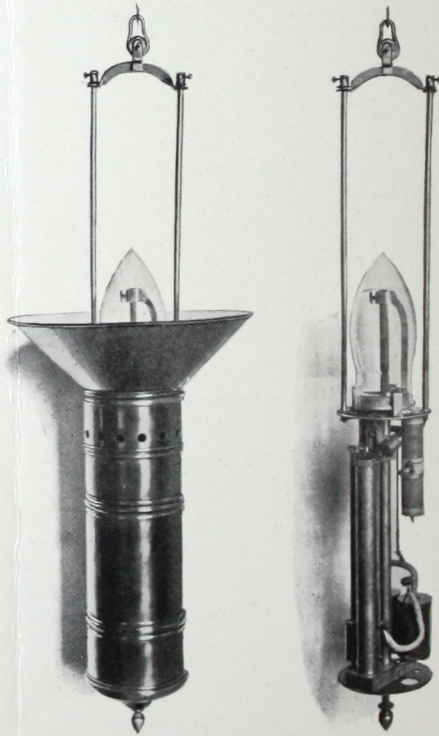


Figure 5



Third—(Figure 7). Our standard lamp may be equipped with a large mirror lined reflector placed below the arc. The mirrors then reflect the light up against the ceiling whence it is reflected downward into the room. This provides a very perfect distribution of the light.

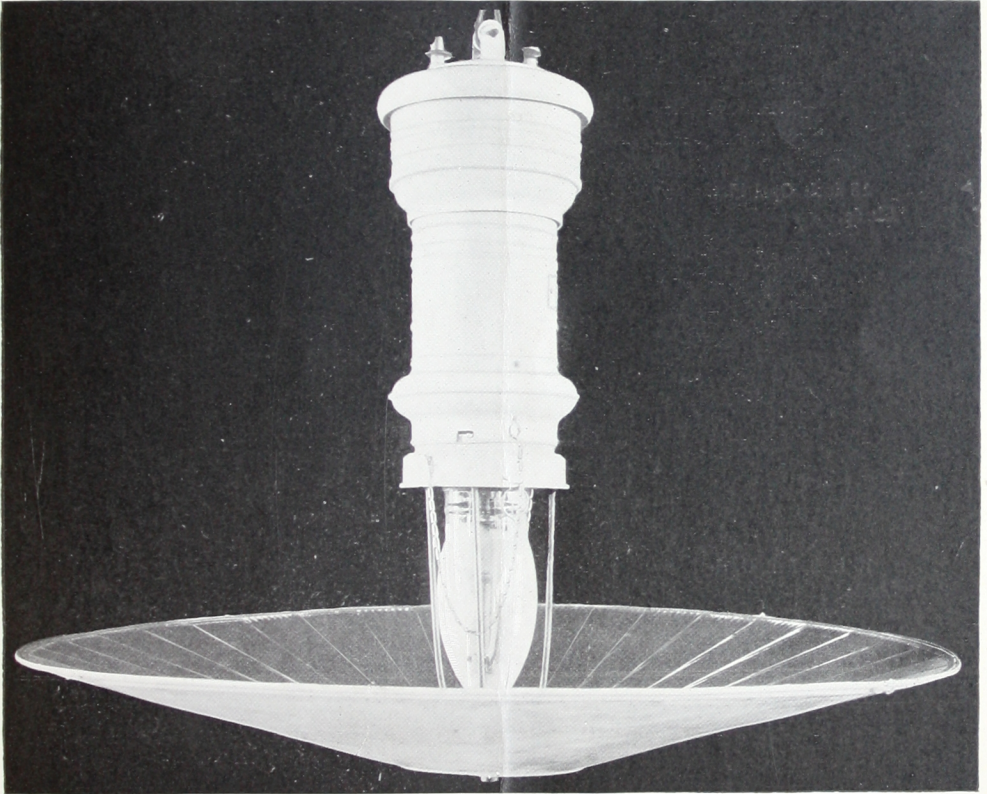


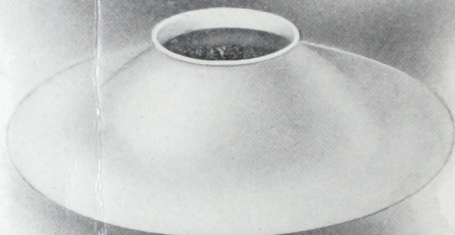
Figure 7. Standard Lamp with Inverted Mirror Reflector



12 inch Ball,  
Clear Opalescent or  
Opal Globe.



18 inch Opal Flat  
Shade.



16 inch Bell, Opal  
Shade.



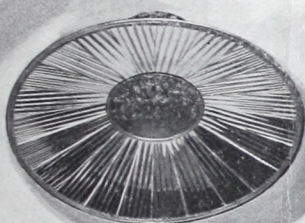
#### **Glass Globe and Shades**

The globe and shades shown are of glass. The globe is furnished either of clear or opal glass. The shades are made of a heavy opal glass which reflects nearly the whole of the light. Either of these globes or shades or the lower metal shade shown on the next page are furnished with the lamp without extra charge.

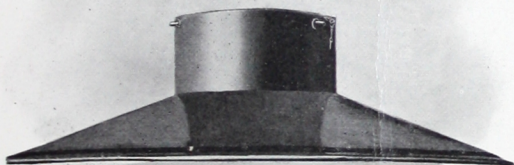




22 inch Metal  
Porcelain Lined.



16 inch Mirror.



16 inch Metal  
Painted.

### Metal Shades

The lower metal shade on this page has a white painted reflecting surface. The middle shade is similar to the lower but has a corrugated mirror reflecting surface. The upper shade is of metal and is porcelain enameled, is very durable and furnishes a good, permanent reflecting surface.

The porcelain-lined shade is furnished with any lamp for \$1.50 additional, the mirror reflector for \$2.00 extra, and the painted metal reflector at no additional charge.



## 110 Volt Lamps

For Indoor or Outdoor Service

Standard Casing

Type No.	Code Wood	Current Amperes	Finish	Price
500	Adoptulos	5	Japan Black	\$22.00
530	Adoptulum	4	" "	22.00
560	Adoquin	3	" "	22.00
501	Adoquines	5	Brushed Brass	23.00
531	Adorabilem	4	" "	23.00
561	Adorabilis	3	" "	23.00
502	Adorably	5	Polished Brass	23.00
532	Adoramento	4	" "	23.00
562	Adorant	3	" "	23.00
503	Adoraras	5	Dead Black	23.00
533	Adorarem	4	" "	23.00
563	Adorassent	3	" "	23.00
504	Adoration	5	Oxydized Copper Black	23.50
534	Adquirebas	4	" " "	23.50
564	Adquirenda	3	" " "	23.50
505	Aduanar	5	Oxydized Copper Spotted	23.50
535	Aduanareis	4	" " "	23.50
565	Aduane	3	" " "	23.50
506	Adverbero	5	Unfinished Copper	23.50
536	Adverbiado	4	" "	23.50
566	Adverbish	3	" "	23.50
510	Advergegam	5	Polished Copper	24.00
540	Advergenti	4	" "	24.00
570	Advergimus	3	" "	24.00

## 110 Volt Lamps

For Indoor or Outdoor Service

Plain Casing—Factory Type

Type No.	Code Wood	Current Amperes	Finish	Price
507	Advergit	5	Steel, Japan Black Finish	\$21.00
537	Advergunt	4	" " " "	21.00
567	Adverret	3	" " " "	21.00
511	Adnitebar	5	Steel, Oxydized-Copper Finish	21.00
541	Adnisum	4	" " " "	21.00
571	Adnisos	3	" " " "	21.00
508	Adversant	5	Unfinished Copper	23.00
538	Adversario	4	" "	23.00
568	Adversativ	3	" "	23.00
509	Adversator	5	Polished or Brushed Brass	22.00
539	Aehre	4	" " "	22.00
569	Aehrenlese	3	" " "	22.00

These lamps are furnished with either globe or shade as desired. A five ampere lamp is rated at 2000 c. p., a four ampere at 1600 c. p., and a three ampere at 1200 c. p. When ordering mention type number or code word, and glass wanted.



## 220 Volt Lamps

For Indoor or Outdoor Service

Standard Casing

Type No.	Code Word	Current Amperes	Finish	Price
600	Aehrenmeer	2½	Japan Black	\$23.00
630	Aehrig	3½	" "	23.00
601	Aenipedis	2½	Brushed or Polished Brass	24.00
631	Anipes	3½	" " "	24.00
603	Aenona	2½	Dead Black	24.00
633	Aenulo	3½	" "	24.00
605	Aenus	2½	Oxydized Copper Spotted	24.50
635	Aeolanthé	3½	" " "	24.50
606	Aeolensem	2½	Unfinished Copper	24.50
636	Aeolensis	3½	" "	24.50
610	Aeolensium	2½	Polished Copper	25.00
640	Aeoliam	3½	" "	25.00

## 220 Volt Lamps

For Indoor or Outdoor Service

Plain Casing—Factory Type

Type No.	Code Word	Current Amperes	Finish	Price
607	Aeriferum	2½	Japan Black	\$22.00
637	Aerificaba	3½	" "	22.00
608	Aerified	2½	Unfinished Copper	24.00
638	Aeriform	3½	" "	24.00

## 110 Volt Lamps

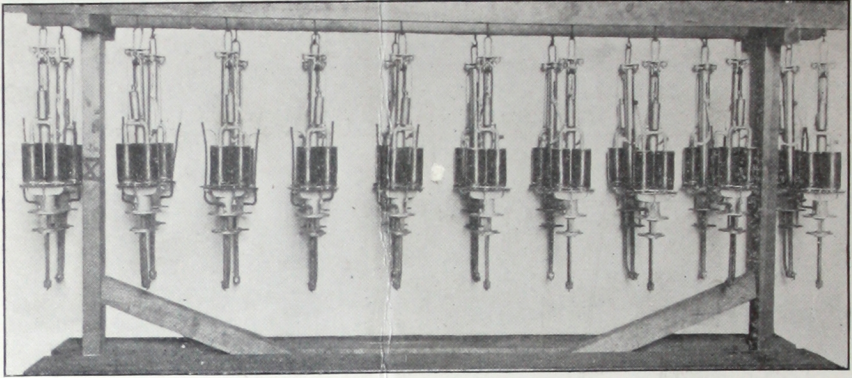
Short Type

For Indoor or Outdoor Service

Type No.	Code Word	Current Amperes	Finish	Price
575	Alementhe	5	Japan Black	\$24.00
585	Alemonae	4	" "	24.00
595	Alemonides	3	" "	24.00
576	Alemonis	5	Oxydized Copper	26.00
586	Alenassimo	4	" "	26.00
596	Alenavano	3	" "	26.00
577	Alenavi	5	Polished or Brushed Brass	25.00
587	Alenbock	4	" " "	25.00
597	Alendos	3	" " "	25.00

These lamps are furnished with either globe or shade as desired. When ordering, mention type number and code word, and glass wanted.





## Toerring Arc Lamps Are Used by

AMERICAN BRIDGE CO.  
Pittsburg, Pa.  
SOUTHERN RAILWAY CO.  
Spencer, N. C.  
INGERSOLL SERGEANT DRILL CO.  
Phillipsburg, N. J.  
CHAS. BROADWAY ROUSS  
New York City  
BALL ENGINE COMPANY  
Erie, Pa.  
LINK BELT ENGINEERING CO.  
Philadelphia, Pa.  
UNITED VERDE COPPER CO.  
Jerome, Ariz.  
E. J. MANVILLE MACHINE CO.  
Waterbury, Conn.  
MCCLINTIC MARSHALL CONST'N CO.  
Pottstown, Pa.  
SALEM IRON WORKS  
Winston-Salem, N. C.  
OTTO GAS ENGINE WORKS  
Philadelphia, Pa.  
THE O. ARMLEDER CO.  
Cincinnati, Ohio  
BULLARD MACHINE TOOL CO.  
Bridgeport, Conn.

AMERICAN LOCOMOTIVE WORKS  
Paterson, N. J.  
DIAMOND DRILL & MACHINE CO.  
Birdsboro, Pa.  
AMERICAN PULLEY CO.  
Philadelphia, Pa.  
DREXEL INSTITUTE  
Philadelphia, Pa.  
STANLEY G. FLAGG & CO.  
Pottstown, Pa.  
LOOKOUT MOUNTAIN IRON CO.  
Battelle, Ala.  
HARRISON SAFETY BOILER WORKS  
Philadelphia, Pa.  
EATON COLE & BURNHAM CO.  
Bridgeport, Conn.  
ELECTRO DYNAMIC CO.  
Bayonne, N. J.  
ENTERPRISE MFG. CO.  
Philadelphia, Pa.  
EDWIN HARRINGTON SONS & CO.  
Philadelphia, Pa.  
PITTSBURG VALVE, FOUNDRY & CONST'N CO.  
Pittsburg, Pa.  
TAYLOR IRON & STEEL CO.  
High Bridge, Pa.

